



Puget Sound Nutrient Forum

Watershed Nitrogen Monitoring & Modeling

December 7, 2022

Welcome & Updates on Related Work

Melissa Gildersleeve, Ecology (ECY)



Puget Sound Nutrient Forum General Update

Nonpoint Plan and Voluntary Clean Water Guidance for Agriculture-
December 14 Webinar – Comments due December 23

Marine Water Quality Implementation Strategy

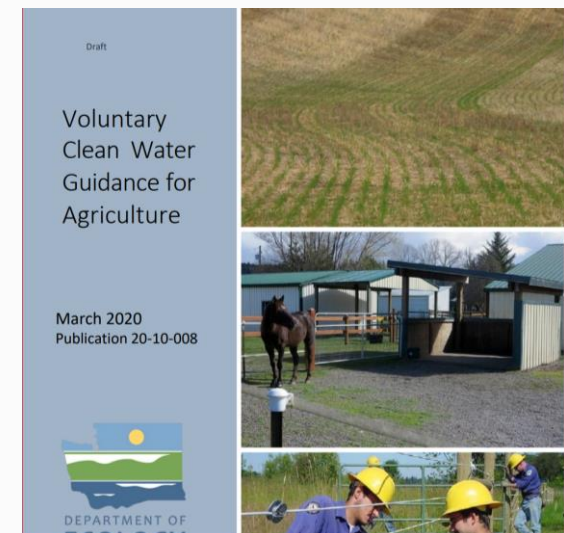
Draft out for Science Panel Review - coordinated by Puget Sound Partnership's science board. A draft for public review should be available in the next 3 months.

If you have questions please reach out to Frances at Frances.Bothfeld@ecy.wa.gov.



**Washington's Water Quality Management
Plan to Control Nonpoint Sources of
Pollution**

Draft for Public Review



Puget Sound Nutrient Forum General Update

Water Quality Trading Budget Proviso

to recommend one or more draft structures for nutrient credit trading that could be used to efficiently and quickly achieve nutrient discharge reductions for point source dischargers covered under the Puget Sound nutrient general permit.

By June 30, 2023, the department must submit a report tothat summarizes the draft structure or structures and describes a tribal consultation and a stakeholder engagement process to solicit feedback on the draft structure or structures and any necessary statutory changes and funding.

VERY short timeframe-draft done by March 2023

Puget Sound Nutrient Forum

General Update

TMDLS

Budd Inlet Dissolved Oxygen TMDL was submitted to EPA on October 26. This plan should lead to an increase in dissolved oxygen levels within Budd Inlet.

White River pH TMDL will go to EPA soon. It limits nutrients and describe best management practices (BMPs) needed to reduce phosphorus pollution (many of those BMPS will also address other nutrients-nitrogen).

TMDL Constructive Submission Litigation

- Puget Sound Dissolved Oxygen – in settlement discussions (EPA and Litigants)
- Washington Water Quality Assessment and TMDL Production - in settlement discussions (EPA Litigants and Ecology)

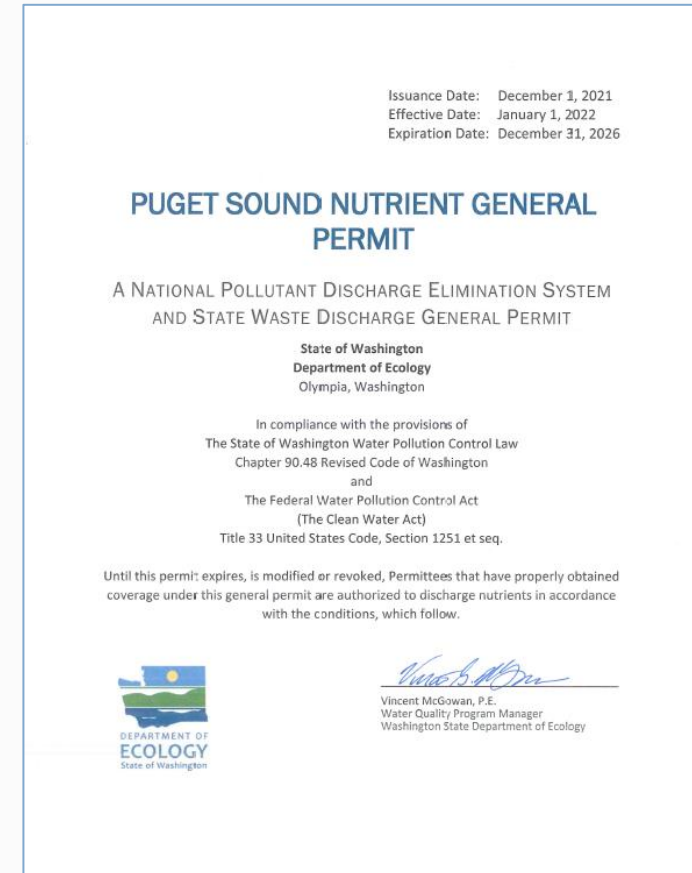
Puget Sound Nutrient General Permit Update



Adrien Carroll-Perkins, P.E., ECY

The Puget Sound Nutrient General Permit

- Issued December 1, 2021 and became effective January 1, 2022
- Direct discharges from WWTPs to the Puget Sound
- Splits dischargers into 3 categories
 - Small
 - Moderate
 - Dominant
- Permit has been Appealed



Puget Sound Nutrient General Permit: Requirements for the first five years



Optimize current treatment processes to enhance nutrient reductions



Monitor raw wastewater and the plant's discharge to evaluate nutrient reductions and optimization progress

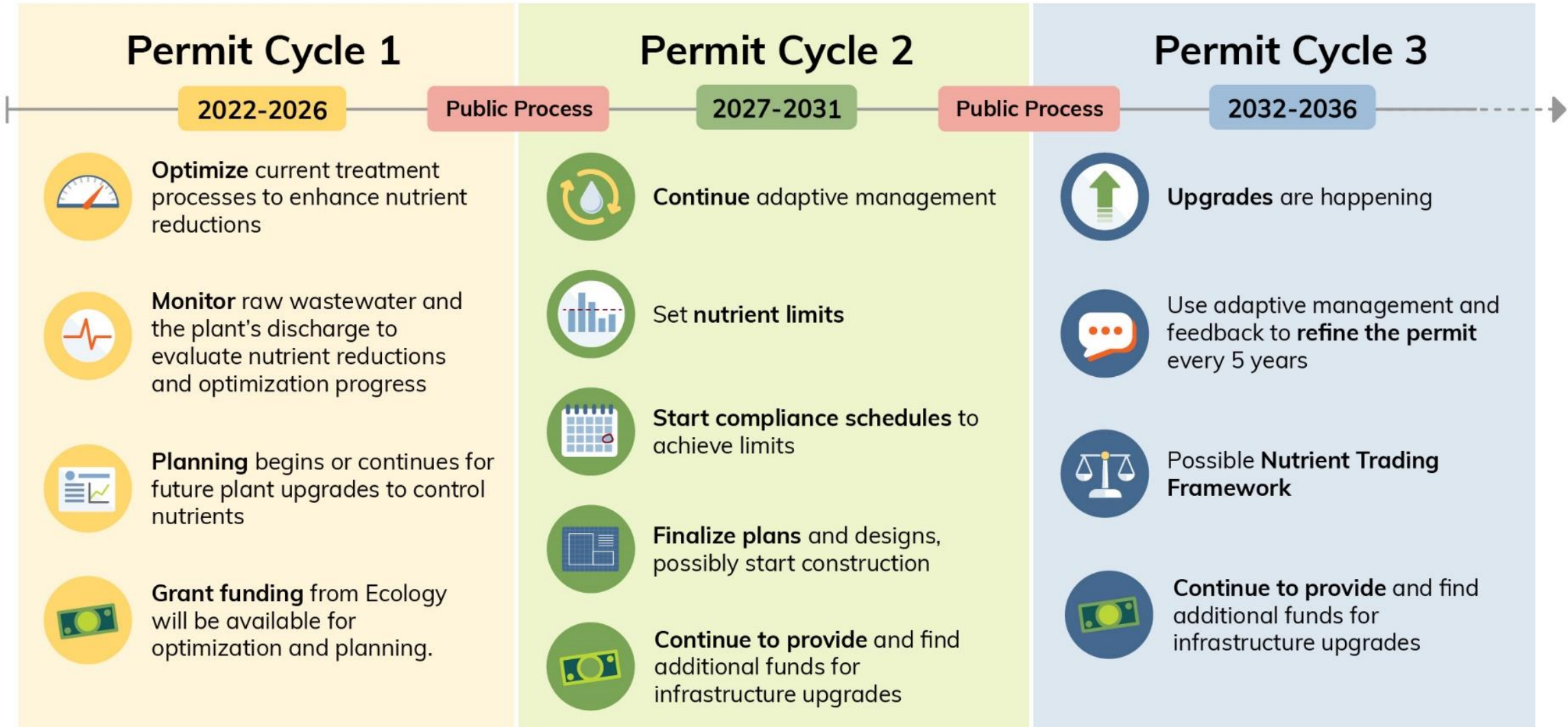


Planning begins or continues for future plant upgrades to control nutrients



Grant funding from Ecology will be available for optimization and planning.

Puget Sound Nutrient General Permit Cycles



Questions?

Please type your question in the chat box



Meet today's presenters



Dustin Bilhimer, ECY



Markus Von Prause, ECY



Noah Schmadel, USGS



Daniel Dugger, ECY



Cristiana Figueroa-Kaminsky, ECY

Today's Topics

- 1 Watershed inflow TN targets and water clean-up actions
- 2 Watershed continuous nitrogen monitoring
~~ Short 5-10 Minute Break ~~
- 3 Puget Sound Seasonal SPARROW watershed nutrient model
- 4 Next Steps

First Up



Dustin Bilhimer, ECY

- 1 Watershed inflow TN targets and water clean-up actions
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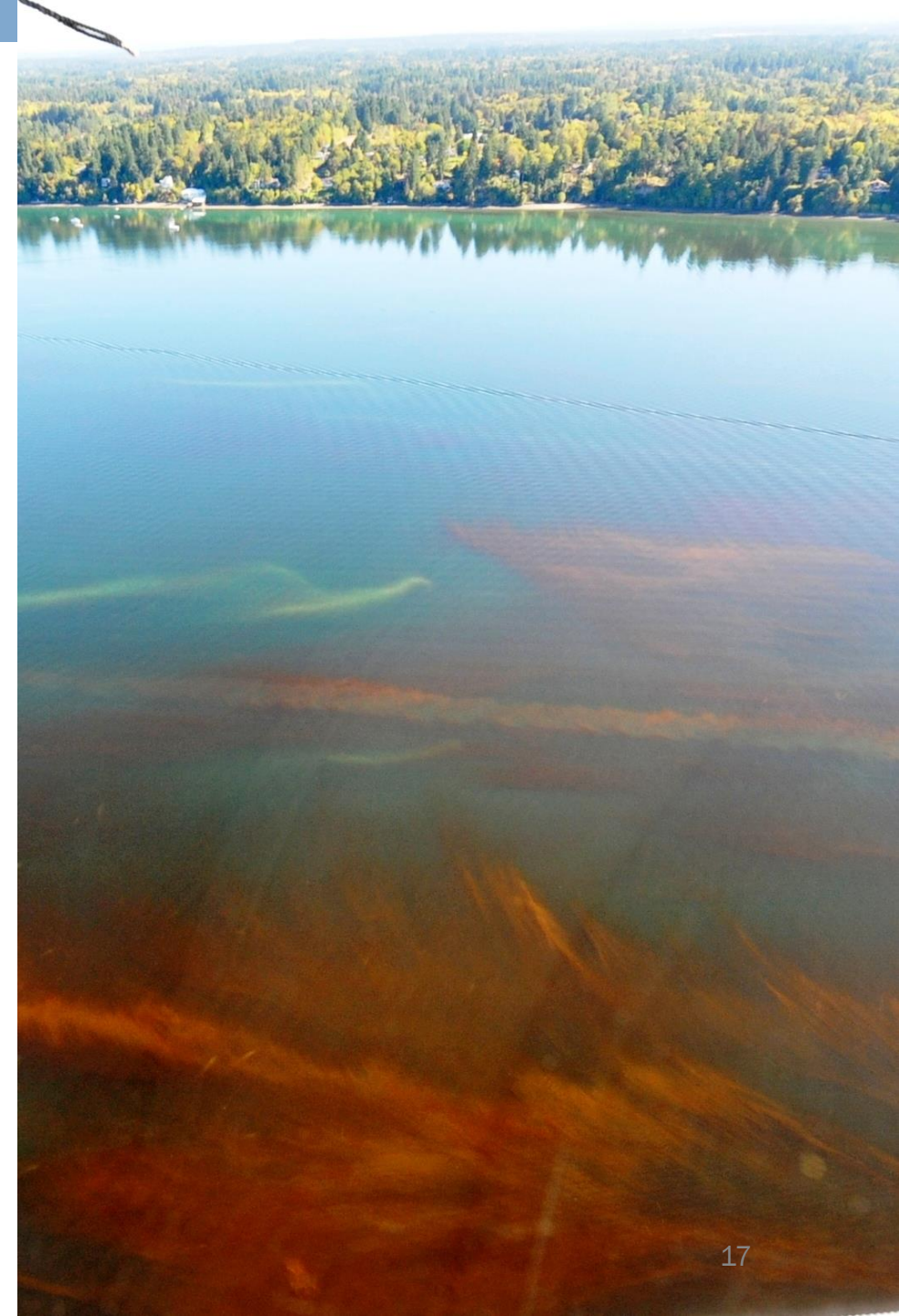


Why we're here:

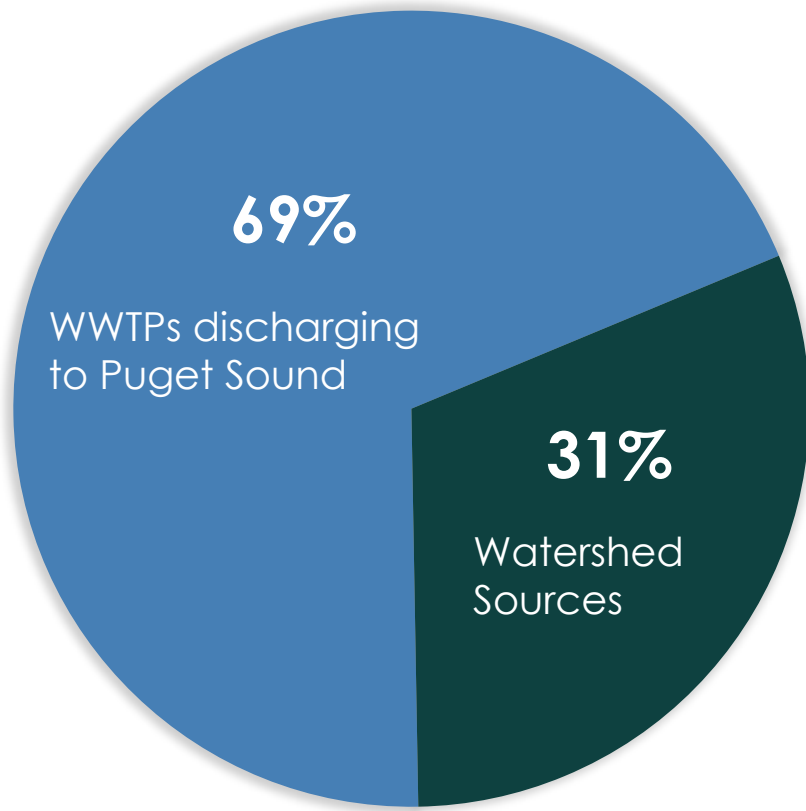
to restore Puget Sound.

Our strategy: reduce human sources of nutrients

- Focus on where we can make biggest and fastest impact to meet standards
- Continue modeling: identify areas most sensitive to human actions
- Define levels of reductions needed from WWTPs and watersheds



Focus on where we can make biggest and fastest impact to meet marine DO standards



What we learned from Bounding Scenarios Report (2019):

- Confirmed human sources of nutrients exacerbate low DO
- WWTP discharges contribute most to low DO
- Watershed nutrient loads also contribute to low DO

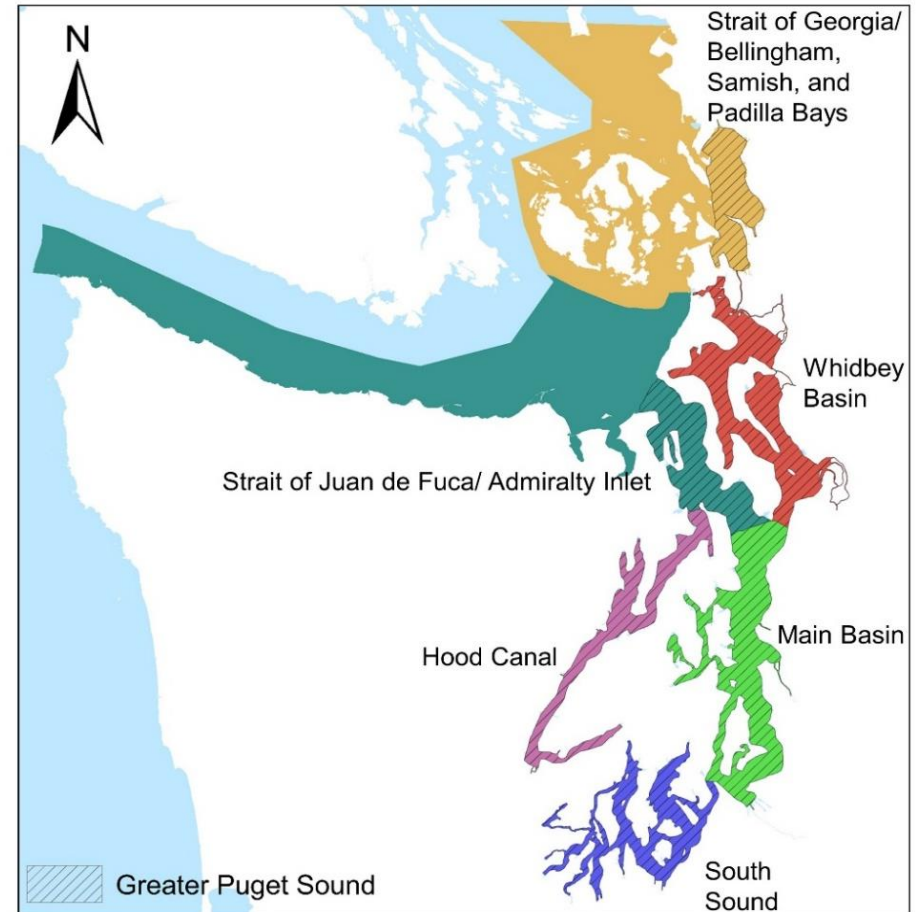
Salish Sea Modeling Informs Nutrient Targets

Year 1 Optimization Scenarios (2021)

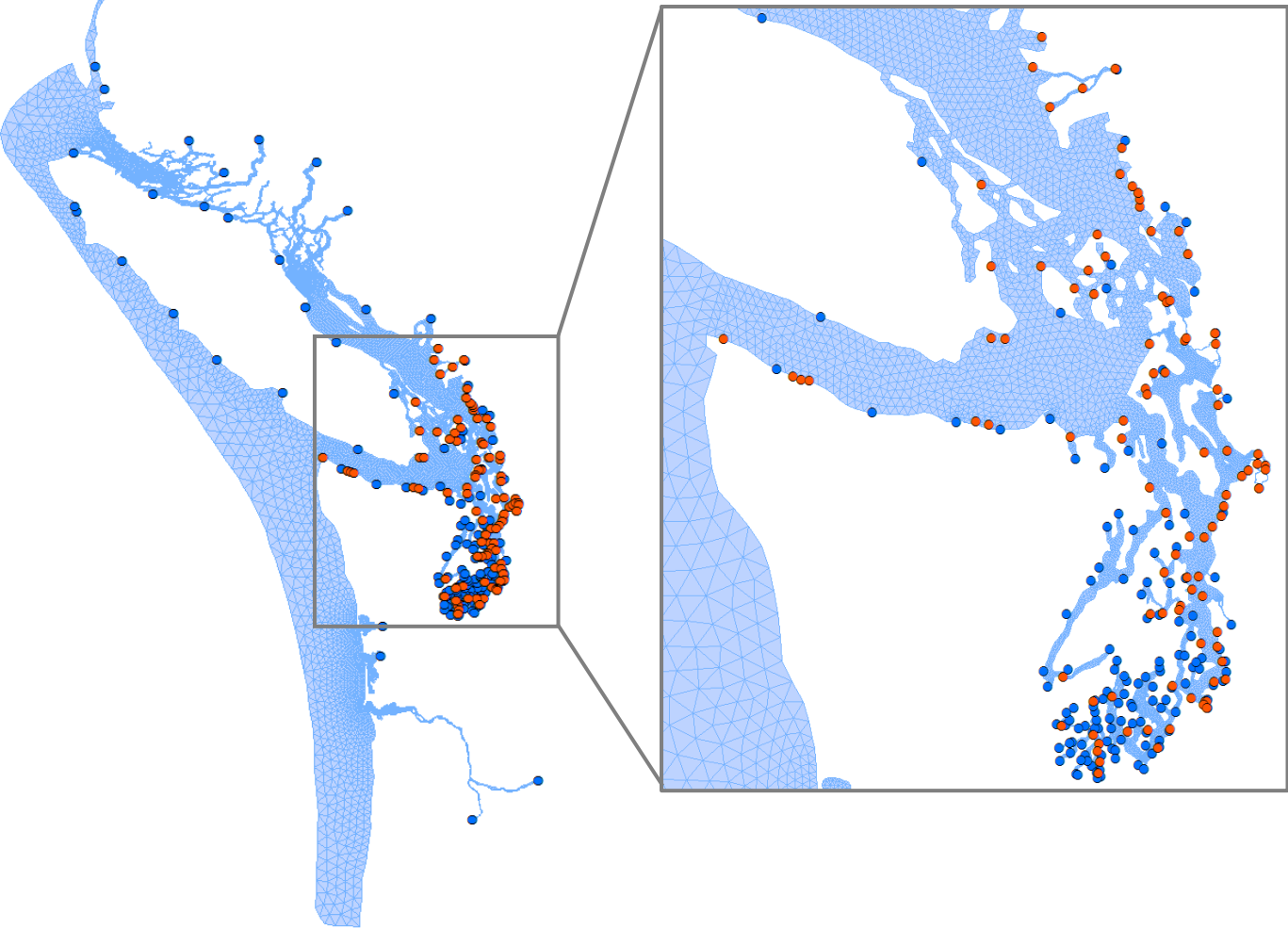
- DO impacts from watershed inflows
- Annual WWTP reductions
- Future population growth impacts
- Combinations of WWTP and Watershed Inflow reductions

Year 2 Optimization Scenarios (2024)

- Testing different frameworks for potential WWTP and Watershed Inflow targets



Define levels of reductions needed to meet standards



● **Marine point sources**

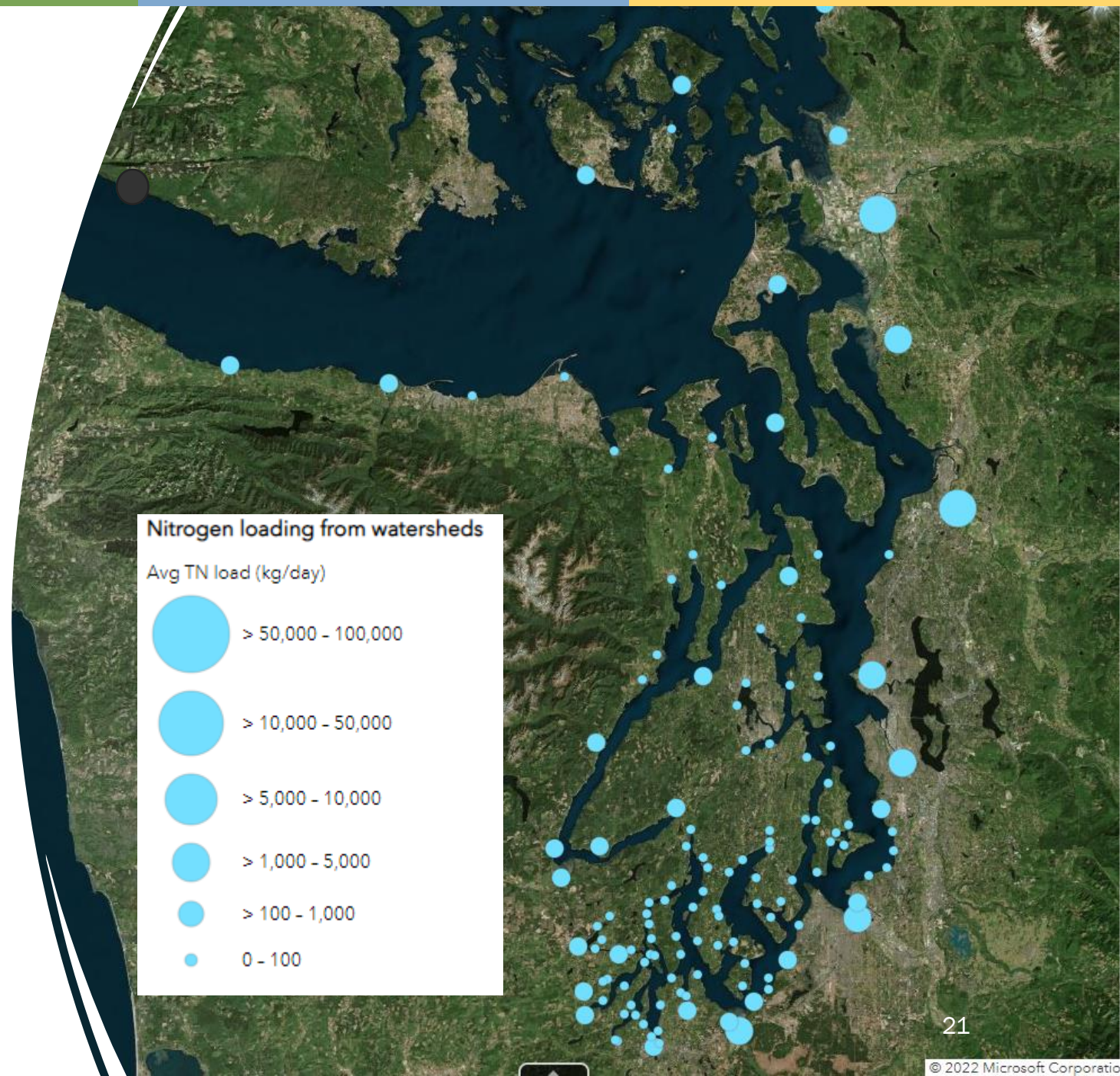
➔ NPDES permit limits

● **Watersheds**

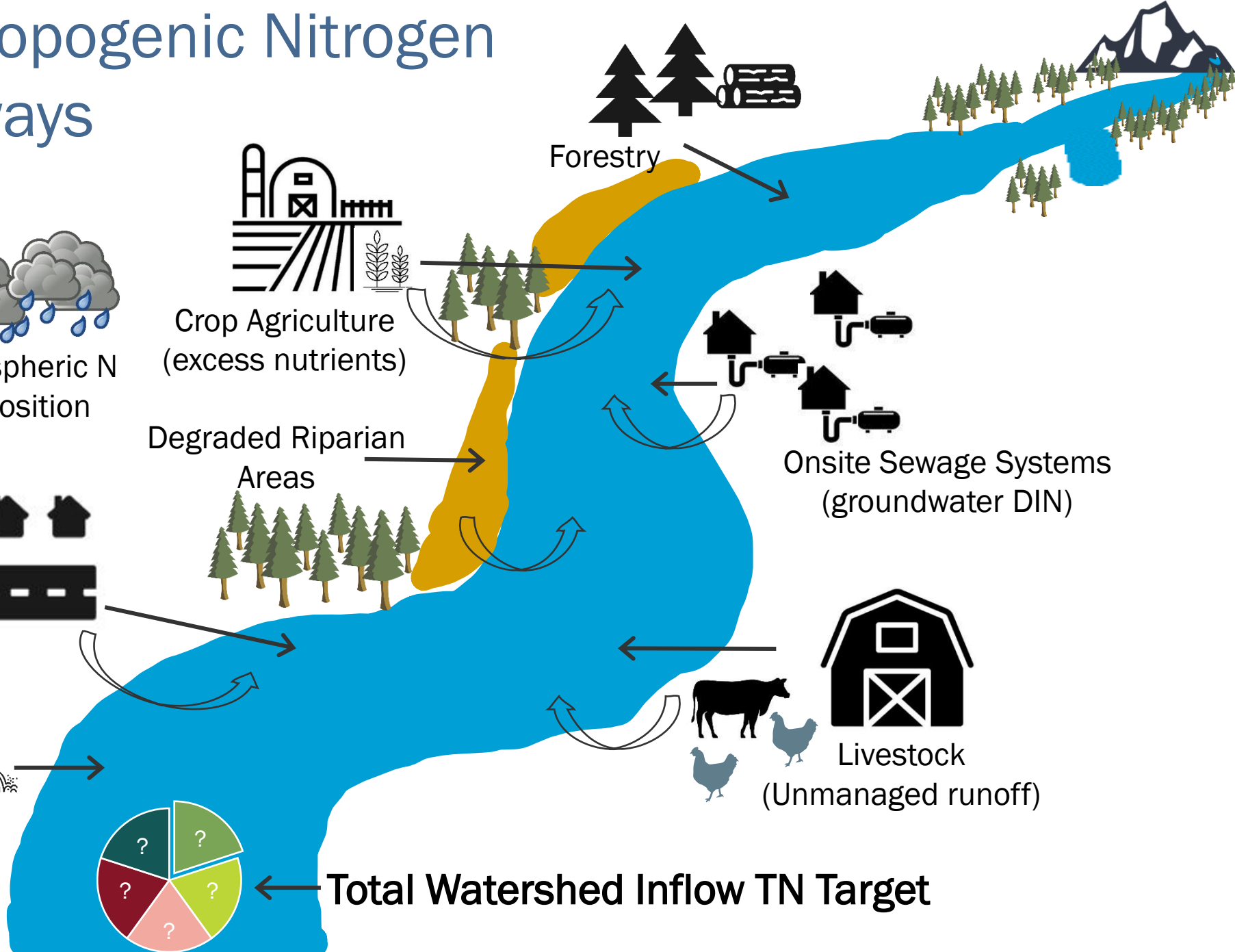
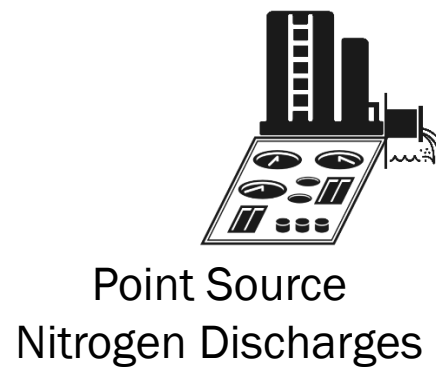
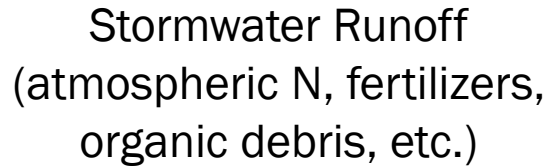
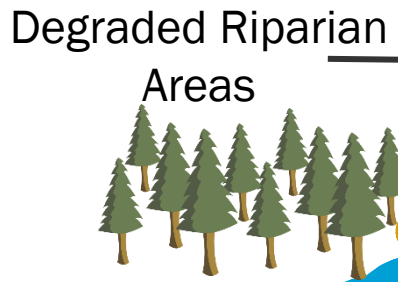
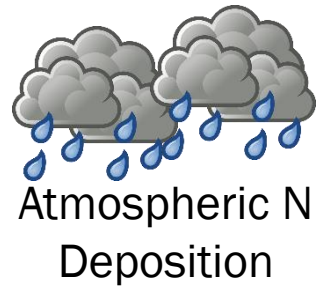
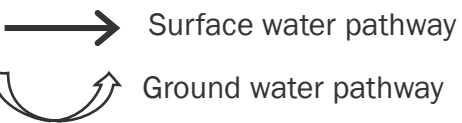
➔ Point source targets
Nonpoint source targets

Watershed Inflow Targets

- Total Nitrogen (TN) Load Targets for each watershed inflow
- TN Reductions needed in just about every watershed
- Year 2 Optimization Scenarios inform Ecology's proposal for draft targets
- Forum Discussion on draft targets in 2024



Watershed Anthropogenic Nitrogen Sources & Pathways



Watershed TN Water Clean-Up Plans

- Total Maximum Daily Load (TMDL) development and implementation
 - Nitrogen allocations for point and nonpoint sources
 - Study, plan, then implement
- Straight to Implementation (STI) Projects
 - Reduce nonpoint source nitrogen loads
 - BMP implementation focused

Identify anthropogenic sources in each watershed inflow (133 TN targets) and reduce or eliminate anthropogenic nitrogen loads

Existing Work to Address Known Nonpoint Source Pollution



Agricultural BMPs



Pollution Identification & Control



Riparian Restoration

Watershed Water Clean-Up Priorities

Understand the distribution of point and nonpoint sources among watersheds

Compare the relative magnitude of point and nonpoint source loads and yields between watersheds

Strategize actions that lead to successful TN load reductions and meet watershed inflow targets

WHAT, WHERE, & HOW MUCH



BIGGEST, EFFICIENT, &
EFFECTIVE IMPROVEMENT

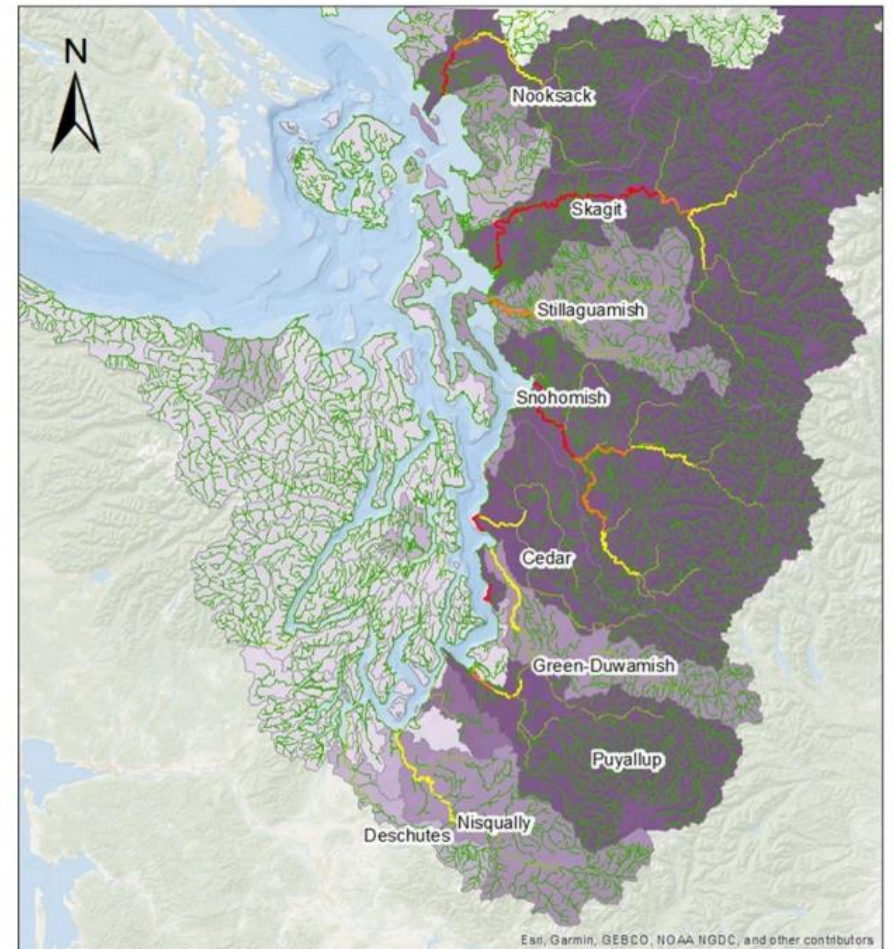
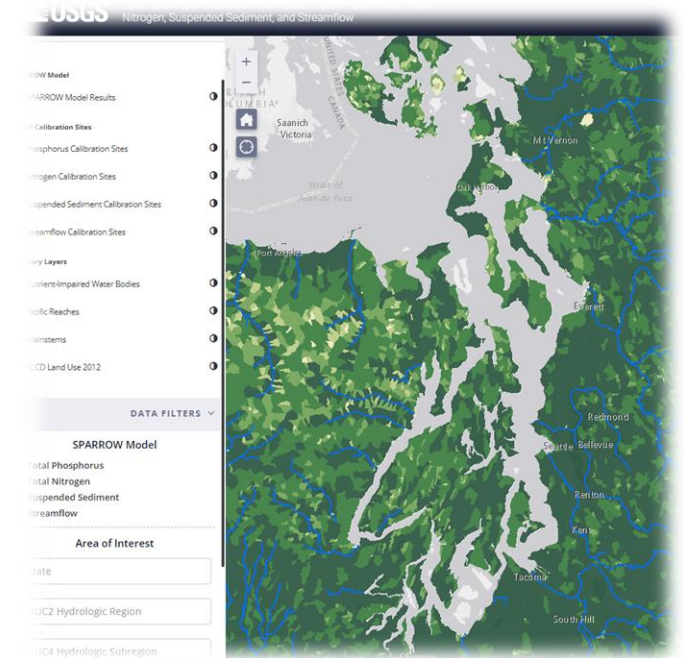
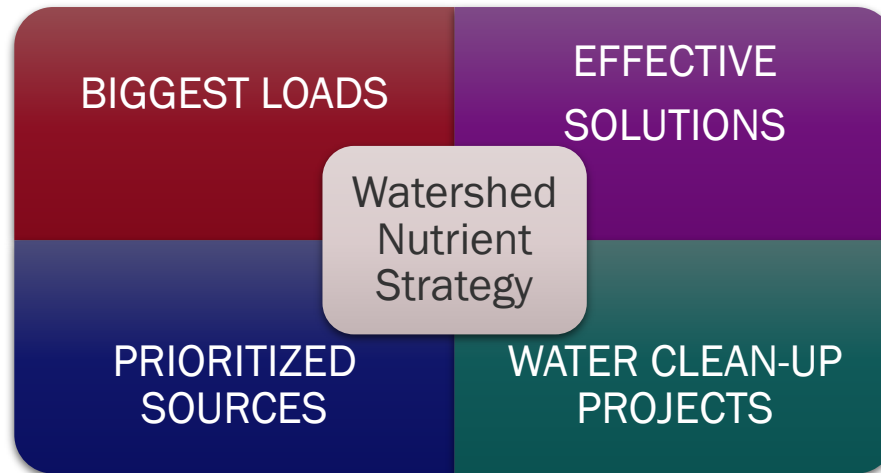


Figure 19. Map showing Salish Sea Model (SSM) and SPARROW total nitrogen load estimates (2002).

New Data Collection and Watershed Modeling



Continuous Nitrogen River Monitoring



Developing a Dynamic SPARROW Nutrient Load Model

In closing,...



Dustin Bilhimer, ECY

1

Watershed inflow TN targets and water clean-up actions

2

Watershed continuous nitrogen monitoring

~~ Short 5-10 Minute Break ~~

3

Puget Sound Seasonal SPARROW watershed nutrient model

4

Next Steps

Potential Forum Discussions in 2023

Known nitrogen point and nonpoint source problems and what can we do over the next 5 years to begin to address them

Tools and information needed to successfully implement nitrogen reductions



PLEASE ADD
TO THE CHAT

Watershed nutrient topics are you interested in?

Nutrient Reduction Plan Schedule

- Salish Sea Modeling (Year 2 Optimization Scenarios)
- Writing draft sections of the NRP
- Forums to discuss watershed implementation strategies

Forum to Discuss Draft TN Load Targets



We are here

Completion of the Volume 2 SSM Report

Public Review Draft NRP (30-day review)

Ecology Publishes Final Draft and Response to Comments



Thank You!

Project Contact

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